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ABSTRACT

This paper presents results of a recent study designed to identify learning styles in Library and Information Science (LIS) students of the twenty-first century, and to determine whether information-oriented students are more likely than a control group to exhibit sequential and visual learning styles. This paper also discusses the results of a classroom experiment designed to make students aware of differences in learning styles and the need to accommodate multiple learning styles when creating learning activities in practice. Subjects were 56 graduate LIS students in four different LIS courses. Subjects' learning styles were evaluated on four scales: sequential versus global, active versus reflective, sensory versus intuitive, and visual versus verbal. Includes two tables and five figures. (Contains 10 references.) (AEF)

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Accommodating all learners: critical inquiry and learning styles in the LIS classroom

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Introduction

Most graduate programs in Library and Information Science (LIS) require that students complete a number of mandatory "core" courses before proceeding to elective courses. Some of these courses lend themselves to hands-on exercises, computer laboratory work, or solitary learning activities such as literary research. Others demand group work, role playing, or other interpersonal activities. Teaching methods frequently include multiple instructional modes, from the grand lecture, audiovisual or Web-assisted presentations, lab time, and group work. Many involve class presentations, with increasing instructor preference for computer-produced slide shows.

Which of these delivery methods are likely to be more useful for incoming LIS students, and have their learning styles changed along with technology? Education and LIS literature published fifteen to twenty years ago (Ford, 1985; Johnson & White, 1981; Jonassen & Hodges, 1982; Stein, Hand, & Totten, 1986; Stein & Totten, 1983; Varlejs, 1985) has suggested that LIS students tended to be less people-oriented, to be more interested in theoretical or abstract ideas, to get meaning from seeing information rather than hearing it, and to possess strong values systems. Regardless of location, LIS students on the whole tended to exhibit similar learning styles. Moreover, those styles were dissimilar to students in other fields,

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suggesting that LIS education attracted a particular type of student. Nonetheless, the advent of technology and the Internet have considerably changed the LIS profession and the education of LIS students (Holland, 2000; Poole & Denny, 2001). The literature further suggests that accommodating students' particular learning styles might improve the learning process. Since not all students feel comfortable using every mode, making students aware of their own learning styles might encourage them to plan their study time, stave off anxiety about stressful activities, and seek extra help if necessary.

This paper presents results of a recent study designed to identify learning styles in LIS students of the twenty-first century, and to determine whether information-oriented students are more likely than a control group to exhibit sequential and visual learning styles. This paper will also discuss the results of a classroom experiment designed to make students aware of differences in learning styles and the need to accommodate multiple learning styles when creating learning activities in practice.

Method

Subjects for this study were 56 graduate LIS students in four different LIS courses. Students in the control group were registered in one of two core courses at the University at Buffalo, required of all LIS students graduating from that program. Of the 56 students, 26 were in the control group, while the remainder were in the technology group. Students in the information-oriented group were registered in a course which explores traditional databases such as DIALOG and OVID, as well as Internet resources. None of these students had received any formal training in learning styles while they were enrolled in these courses.

The instrument students were asked to complete was a Web-based learning styles inventory questionnaire (Felder & Soloman, n.d.). The questionnaire was delivered over a World Wide Web site and initially administered in a classroom setting After completing the survey's 44 questions, students were given the option of reading more about learning styles. Once participants completed the survey and pressed the form's "submit" button, they were shown a screen which plotted their scores across four dimensions. For each dimension, a minimum value of 0 and a maximum value of 22 were possible. Scores between 8 and 14 are "well-balanced on the two dimensions" of the scale.

Results

Subjects' learning styles were evaluated on four scales: sequential versus global, active versus reflective, sensory versus intuitive, and visual versus verbal. According to Felder & Soloman, sequential learners need to acquire information in logical, linear steps; global learners need to see the big picture before they understand the process. Active learners acquire information by using it in discussion or experiment, while reflective learners need to think about it first and prefer working alone. Sensory learners acquire information by connecting it to the real world, while intuitive learners prefer abstract concepts. Visual learners acquire information by seeing pictures, while verbal learners get more out of hearing and words.

The average of learning styles across all subjects is shown in Figure 1, below. Median scores, range, and outliers are shown for each dimension. Table 1 indicates minimum, maximum, median, and modal scores. Scores indicate an almost even distribution of active and reflective learners; half of all learners were active, and the other half reflective. The situation was similar for sequential and global learners. However, these learners showed a preference toward a sensory learning style rather than an intuitive style; 57 percent were markedly sensory-oriented, and another 21 percent were mildly sensory-oriented. There was a pronounced preference for a visual learning style, with 44 percent being markedly visually-oriented and an additional 8 percent being mildly visually-oriented.

As compared to the control group, information-oriented students are slightly more inclined toward reflective, verbal, sensory, global learning styles. The boxplots in figures 2 through 5 compare the control to the technology groups; Table 2 shows minimum, maximum, median, and modal scores for students in the control and technology groups. More of the technology students tended toward a reflective learning style, while control students fell more frequently on the side of the active learning style. However, distributions were very similar overall. Both control and technology students showed considerable preference for sensory learning styles. Control group students were far more visually-oriented than technology students. An analysis of variance test found significant difference between control and technology students on the Verbal-Visual dimension. Control students demonstrated a slight preference for a global learning style, though both control and technology students had large distributions throughout this dimension.

Discussion

The LIS students of the 1980s were described as having a tendency toward analytical skills and the ability to work alone (Johnson & White, 1981, p. 356), gathering learning through words that they saw and through their sense of touch (Jonassen & Hodges, 1982, p. 148; Stein & Totten, 1983, p. 42), being sensitive to the emotions and personal space of other people (Jonassen & Hodges, 1982, p. 148); being sensitive to their own individual needs, responding to aesthetic beauty, a set of values, and time commitments (Jonassen & Hodges, 1982, p. 148; Stein & Totten, 1983, p. 42), with a slight tendency toward holistic rather than serialistic learning styles (Ford, 1985, p. 125). Continuing education students were described as "fairly well balanced" in their learning styles, though "weakest at abstract conceptualization" (Varlejs, 1985, p. 138, 139).

With the increasing availability of information technology, a major transformation of the profession has taken place. However, students seem to have retained many of the traits noted in previously released learning styles research. While the results here cannot be directly compared with those of earlier studies, evidence from this study can speak to some general trends. Although the mean score on the Active-Reflective dimension was 11, the mode was 14, indicating that while some students prefer talking through their learning, a larger group prefer to work alone and think through their learning. This reflects previous research which found that LIS students tend to be field-independent. Results indicated a general preference for the sensory learning style, wherein learners can connect their learning to real world experiences, rather than abstract concepts, echoing previous research which found that continuing education students had the least preference for abstract conceptualization. Previous research indicated that LIS students had a strong orientation toward words that they saw. This trend may be reflected in technology students' verbal orientation. A very slight preference for a global learning style was found, which may reflect the holistic tendency found earlier. However, technology students indicated a preference for sequential learning styles.

In many cases, librarianship involves not only finding information, but presenting that information to a library patron in a form that the patron can understand. "Today, expediency makes at least informal library instruction an absolute necessity" (Katz, 2002, p. 167). Familiarity with the concept of learning styles may help. In a classroom experiment in a library youth services course, the instructor presented information about learning styles in class. Students discussed learning styles, Gardner's multiple intelligences, and shared their experiences with children's learning styles. Because several of the students had been teachers, they had been exposed to the concept of learning styles before as well as during the course. Later in the semester, students were required to deliver two presentations, one a youth program of the type to be enacted in a public or school library, and the other a professional-style presentation. Each youth program featured multiple learning activities: songs, music, art, crafts, stories, and activities. While the learning opportunities presented professional presentations were less diverse, each featured visual

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and auditory elements. Crowded core courses may not provide such latitude. Nevertheless, incorporating some of this richness of presentation into LIS core courses may further the aim of accomodating all learners.

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Figure 1. Medians and ranges intervals for all subjects (n=56).

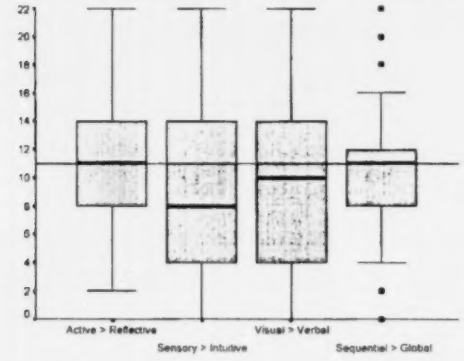

Figure 2. Control versus information-oriented students (n=26, 28) on the Active-Reflective dimension.

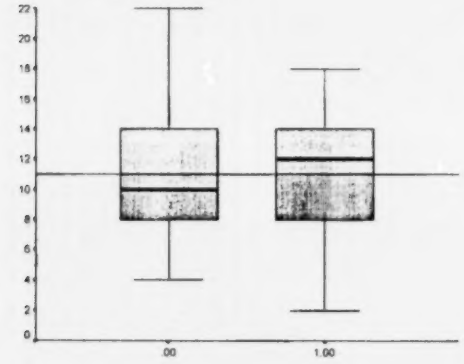

Figure 3. Control versus information-oriented students (n=26, 28) on the Sensory-Intuitive dimension.

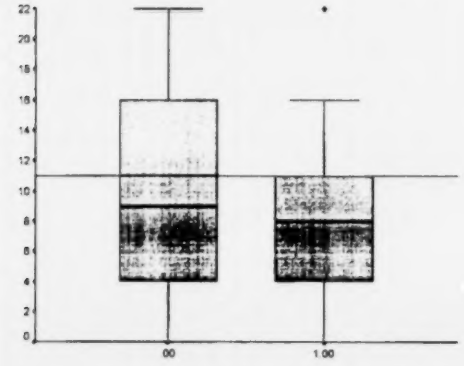

Figure 4. Control versus information-oriented students (n=26, 28) on the Visual-Verbal dimension.

Figure 5. Control versus information-oriented students (n=26, 28) on the Sequential-Global dimension.

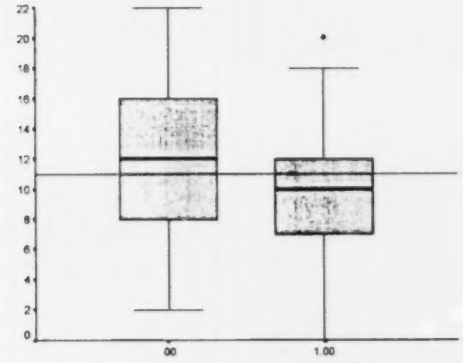

Table 1. General statistics for all subjects (n=56).

	Mean	Median	Mode	Maximum	Minimum
Active > Reflective	11.0	11.0	14.0	22.0	2.0
Sensory > Intuitive	8.8	8.0	4.0	22.0	.0
Visual > Verbal	9.3	10.0	12.0	22.0	.0
Sequential > Global	10.5	11.0	12.0	22.0	.0

Table 2. General statistics for control students (0) and information-oriented students (1)

		Mean	Median	Mode	Maximum	Minimum
Active > Reflective	.00	11.5	10.0	10.0	22.0	4.0
	1.00	10.5	12.0	12.0	18.0	2.0
Sensory > Intuitive	.00	9.9	9.0	2.0	22.0	.0
	1.00	7.8	8.0	4.0	22.0	.0
Visual > Verbal	.00	7.2	8.0	2.0	14.0	.0
	1.00	11.3	12.0	12.0	22.0	2.0
Sequential > Global	.00	11.1	12.0	12.0	22.0	2.0
	1.00	9.9	10.0	12.0	20.0	.0

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